CLASS VI INJECTION ZONE PROPERTIES

INJECTION WELL 357-7R
40 CFR 146.82(c)(4),(7) and 146.87(b)-(d)

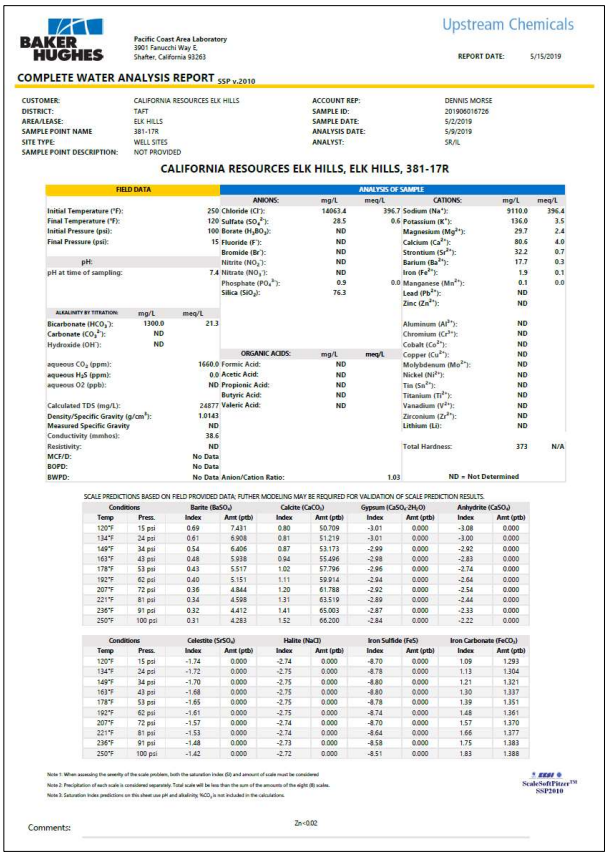
ELK HILLS A1-A2 PROJECT

Injection Zone Chemical and Physical Properties

Water Geochemistry

Produced water geochemistry shows that injection zone total dissolved solids are 24,000 -25,000 milligrams per liter (Figure 1). The Monterey Formation A1-A2 reservoir is depleted due to oil and gas production and has a low current water saturation. As such, the water sample shown in Figure 1 was taken from a sand directly underneath the Monterey Formation A1-A2 reservoir.

Figure 1: Water analysis report for the Monetary Formation reservoir from well 381-17R.



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Upstream Chemicals

REPORT DATE: 5/15/2019

COMPLETE WATER ANALYSIS REPORT SSP v.2010

CUSTOMER:	CALIFORNIA RESOURCES ELK HILLS	ACCOUNT REP:	DENNIS MORSE
DISTRICT:	TAFT	SAMPLE ID:	20190501726
AREA/LEASE:	ELK HILLS	SAMPLE DATE:	5/2/2019
SAMPLE POINT NAME	381-17R	ANALYSIS DATE:	5/9/2019
SITE TYPE:	WELL SITES	ANALYST:	SR/IL
SAMPLE POINT DESCRIPTION:	NOT PROVIDED		

CALIFORNIA RESOURCES ELK HILLS, ELK HILLS, 381-17R

FIELD DATA	
Initial Temperature (°F):	250
Final Temperature (°F):	120
Initial Pressure (psi):	100
Final Pressure (psi):	15
pH:	
pH at time of sampling:	7.4

ALKALINITY BY TITRATION:	mg/L	meq/L
Bicarbonate (HCO_3^-):	1300.0	21.3
Carbonate (CO_3^{2-}):	ND	
Hydroxide (OH^-):	ND	

aqueous CO_2 (ppm):	1660.0
aqueous H_2S (ppm):	0.0
aqueous O2 (ppb):	ND
Calculated TDS (mg/L):	24877
Density/Specific Gravity (g/cm³):	1.0143
Measured Specific Gravity	ND
Conductivity (mmhos):	38.6
Resistivity:	ND
MCF/D:	No Data
BOPD:	No Data
BWPD:	No Data

ANALYSIS OF SAMPLE

ANIONS:	mg/L	meq/L
Chloride (Cl^-):	14063.4	396.7
Sulfate (SO_4^{2-}):	28.5	0.6
Borate ($H_2BO_3^-$):	ND	
Fluoride (F^-):	ND	
Bromide (Br^-):	ND	
Nitrite (NO_2^-):	ND	
Nitrate (NO_3^-):	ND	
Phosphate (PO_4^{3-}):	0.9	0.0
Silica (SiO_2):	76.3	

ORGANIC ACIDS:	mg/L	meq/L
Formic Acid:	ND	
Acetic Acid:	ND	
Propionic Acid:	ND	
Butyric Acid:	ND	
Valeric Acid:	ND	

CATIONS:	mg/L	meq/L
Sodium (Na^+):	9110.0	396.4
Potassium (K^+):	136.0	3.5
Magnesium (Mg^{2+}):	29.7	2.4
Calcium (Ca^{2+}):	80.6	4.0
Strontium (Sr^{2+}):	32.2	0.7
Barium (Ba^{2+}):	17.7	0.3
Iron (Fe^{2+}):	1.9	0.1
Manganese (Mn^{2+}):	0.1	0.0
Lead (Pb^{2+}):	ND	
Zinc (Zn^{2+}):	ND	
Aluminum (Al^{3+}):	ND	
Chromium (Cr^{3+}):	ND	
Cobalt (Co^{2+}):	ND	
Copper (Cu^{2+}):	ND	
Molybdenum (Mo^{2+}):	ND	
Nickel (Ni^{2+}):	ND	
Tin (Sn^{2+}):	ND	
Titanium (Ti^{4+}):	ND	
Vanadium (V^{2+}):	ND	
Zirconium (Zr^{4+}):	ND	
Lithium (Li^+):	ND	
Total Hardness:	373	N/A

Anion/Cation Ratio: 1.03

ND = Not Determined

SCALE PREDICTIONS BASED ON FIELD PROVIDED DATA; FUTHER MODELING MAY BE REQUIRED FOR VALIDATION OF SCALE PREDICTION RESULTS.

Conditions		Barite ($BaSO_4$)		Calcite ($CaCO_3$)		Gypsum ($CaSO_4 \cdot 2H_2O$)		Anhydrite ($CaSO_4$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
120°F	15 psi	0.69	7.431	0.80	50.709	-3.01	0.000	-3.08	0.000
134°F	24 psi	0.61	6.908	0.81	51.219	-3.01	0.000	-3.00	0.000
149°F	34 psi	0.54	6.406	0.87	53.173	-2.99	0.000	-2.92	0.000
163°F	43 psi	0.48	5.938	0.94	55.496	-2.98	0.000	-2.83	0.000
178°F	53 psi	0.43	5.517	1.02	57.796	-2.96	0.000	-2.74	0.000
192°F	62 psi	0.40	5.151	1.11	59.914	-2.94	0.000	-2.64	0.000
207°F	72 psi	0.36	4.844	1.20	61.788	-2.92	0.000	-2.54	0.000
221°F	81 psi	0.34	4.598	1.31	63.519	-2.89	0.000	-2.44	0.000
236°F	91 psi	0.32	4.412	1.41	65.003	-2.87	0.000	-2.33	0.000
250°F	100 psi	0.31	4.283	1.52	66.200	-2.84	0.000	-2.22	0.000

Conditions		Celestite ($SrSO_4$)		Halite (NaCl)		Iron Sulfide (FeS)		Iron Carbonate ($FeCO_3$)	
Temp	Press.	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)	Index	Amt (ptb)
120°F	15 psi	-1.74	0.000	-2.74	0.000	-8.70	0.000	1.09	1.293
134°F	24 psi	-1.72	0.000	-2.75	0.000	-8.78	0.000	1.13	1.304
149°F	34 psi	-1.70	0.000	-2.75	0.000	-8.80	0.000	1.21	1.321
163°F	43 psi	-1.68	0.000	-2.75	0.000	-8.80	0.000	1.30	1.337
178°F	53 psi	-1.65	0.000	-2.75	0.000	-8.78	0.000	1.39	1.351
192°F	62 psi	-1.61	0.000	-2.75	0.000	-8.74	0.000	1.48	1.361
207°F	72 psi	-1.57	0.000	-2.74	0.000	-8.70	0.000	1.57	1.370
221°F	81 psi	-1.53	0.000	-2.74	0.000	-8.64	0.000	1.66	1.377
236°F	91 psi	-1.48	0.000	-2.73	0.000	-8.58	0.000	1.75	1.383
250°F	100 psi	-1.42	0.000	-2.72	0.000	-8.51	0.000	1.83	1.388

Note 1: When assessing the severity of the scale problem, both the saturation index (SI) and amount of scale must be considered
Note 2: Precipitation of each scale is considered separately. Total scale will be less than the sum of the amounts of the eight (8) scales.
Note 3: Saturation Index predictions on this sheet use pH and alkalinity. NO_3^- is not included in the calculations.

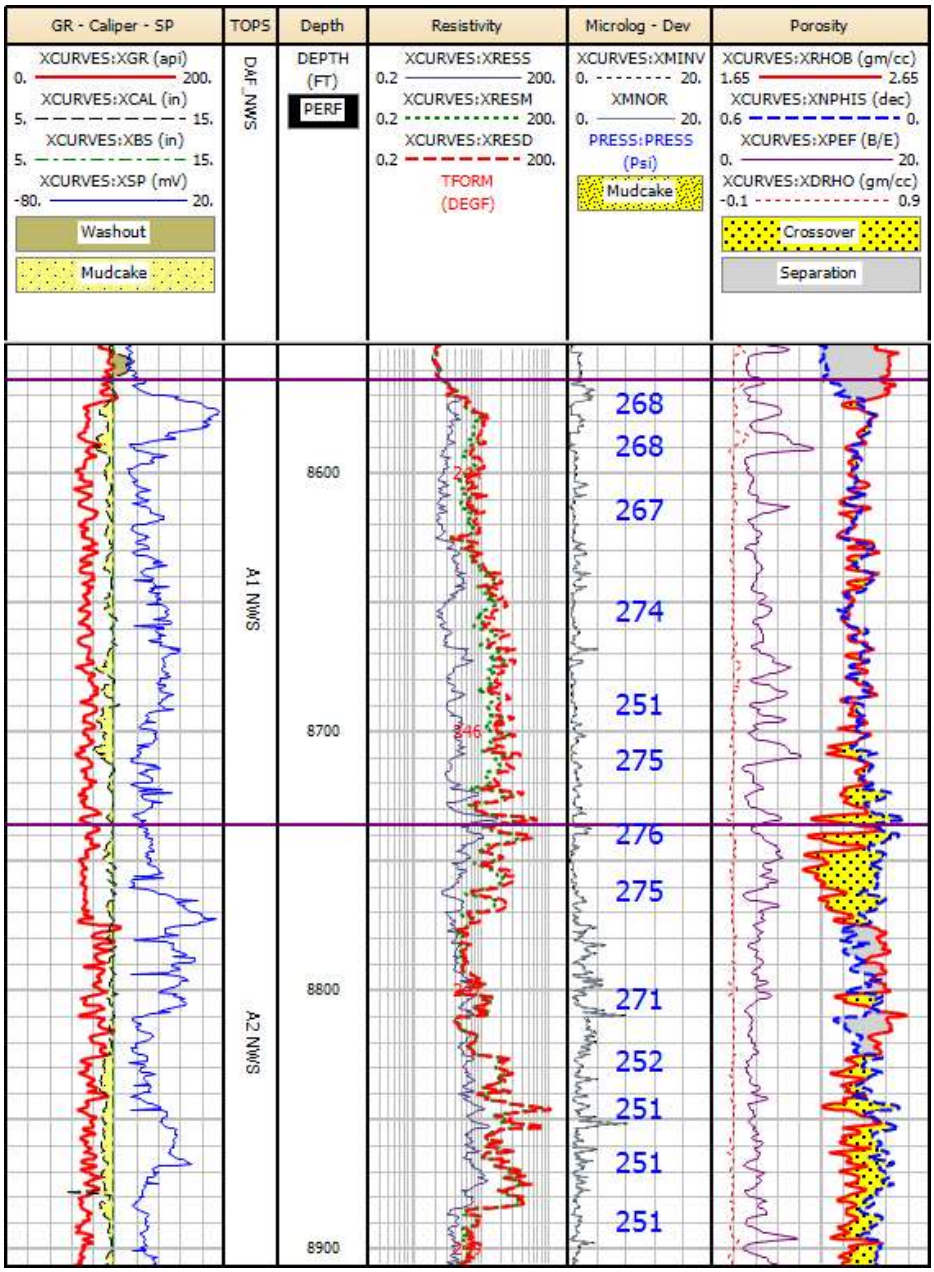
ScaleSoftPitzer™ SSP2010

Comments: Zn<0.02

Reservoir Pressure

Monterey Formation A1-A2 reservoir pressure taken by a wireline formation pressure testing tool in well 364X-7R is shown in Figure 2. Final wireline pressure is plotted numerically in the Microlog track showing pressure between 200 - 300 PSI. The location of well 364X-7R is shown in Figure 4.

Figure 2: Monterey Formation A1-A2 pressure from well 364X-7R.



Below (Figure 3) is an example build-up test from well 364X-7R taken at 8578.86 feet measured depth in the Monterey Formation A1-A2 reservoir. The location of well 364X-7R is shown in Figure 4.

Figure 3: Pressure build-up test for the Monterey Formation A1-A2 reservoir in well 364X-7R.

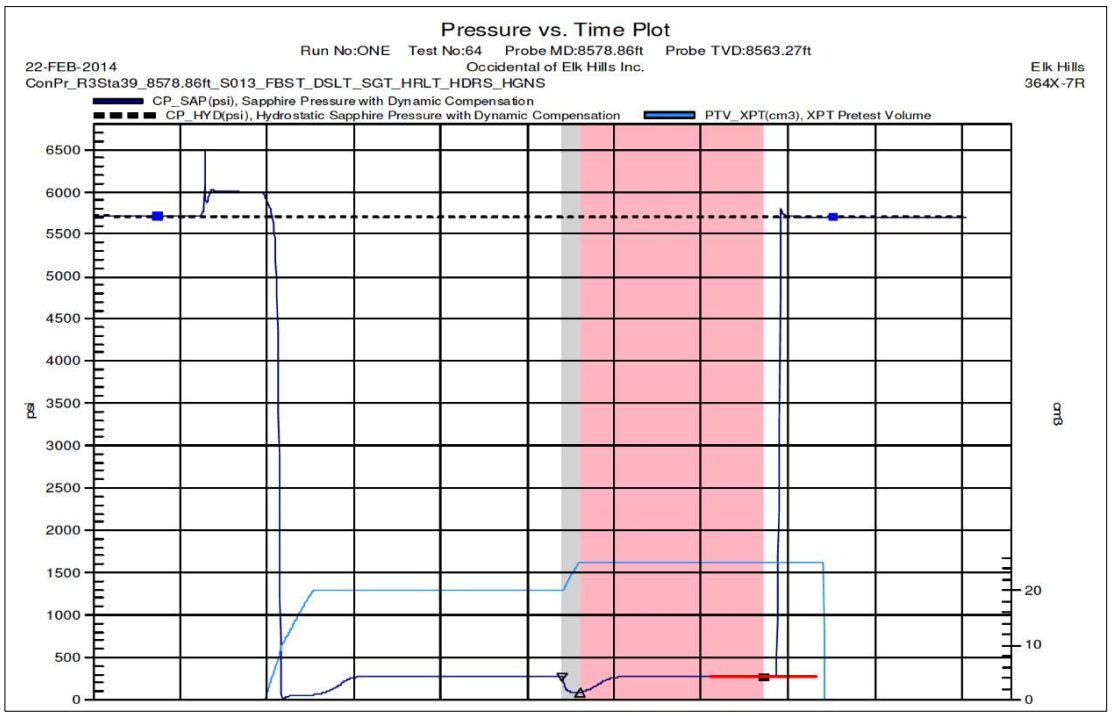
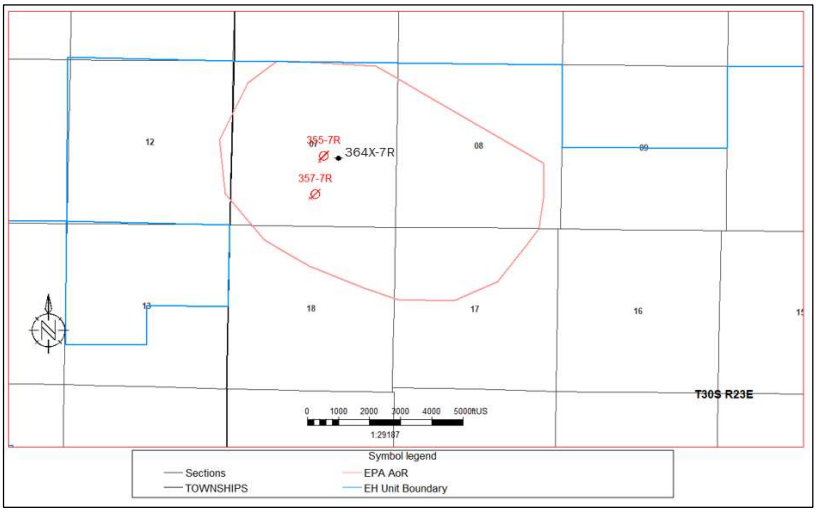


Figure 4: Location of well 364X-7R.



Fracture Gradient

A fracture gradient of 0.97 PSI per foot at 9,428 feet measured depth was acquired in well 327-7R-RD1 (Figure 5). The 327-7R-RD1 well location is shown on the map in Figure 6.

Figure 5: A fracture gradient of 0.97 PSI per foot was measured in well 327-7R-RD1.

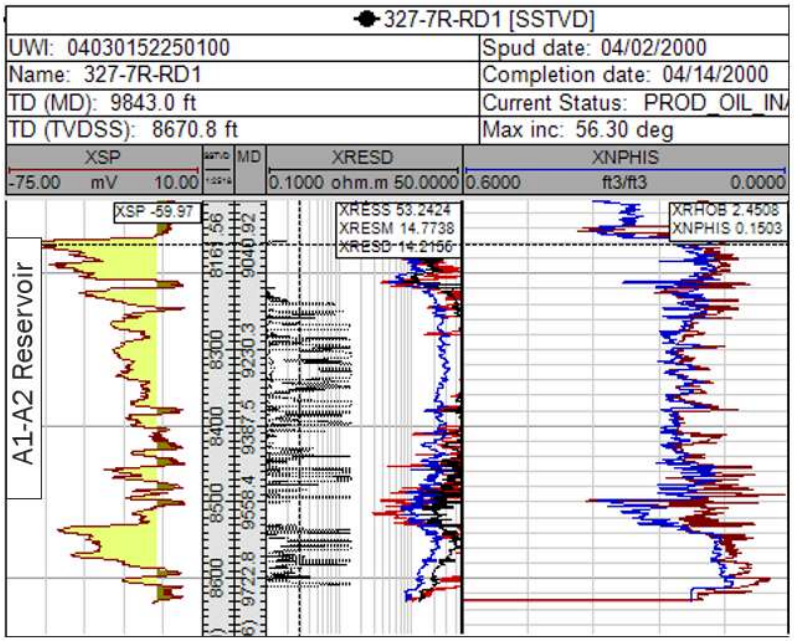


Figure 6: Location of well 327-7R-RD1.